

1 [0015] It is yet another object to have a cathode material used for an electron beam device that  
2 is not highly fragile and has higher adhesive strength.

3 [0016] It is still yet another object to have a cathode material that has an improved lifetime and  
4 increased emission power while not increasing production cost and still having ease of manufacture.

5 [0017] In order to achieve the above objectives, the invention provides a cathode material having  
6 between 0.5 to 9.0 % by weight of a rare earth metal of the cerium group, between 0.5 to 15 % by  
7 weight of tungsten or rhenium or both tungsten and rhenium, between 0.5-10 % by weight of carbon  
8 and the remainder of iridium. When not mentioned explicitly, the percentage is based on the total  
9 weight of the cathode material.

#### BRIEF DESCRIPTION OF THE DRAWINGS

10 [0018] A more complete appreciation of this invention, and many of the attendant advantages  
11 thereof, will be readily apparent as the same becomes better understood by reference to the  
12 following detailed description when considered in conjunction with the accompanying drawings in  
13 which like reference symbols indicate the same or similar components, wherein:  
14

15 [0019] FIG. 1 shows the cathode material used as an electron emission source of a vacuum  
16 electron beam apparatus such as a cathode-ray tube;

17 [0020] FIG. 2 is a graph of operation temperature as a function of the content of carbon in an  
18 emitter that is manufactured using the four-element-alloy of cerium, tungsten, carbon and iridium;  
19 and

20 [0021] FIG. 3 is a graph of the lifetime of an emitter as a function of the content of carbon in the  
21 emitter that is manufactured using the four-element-alloy of cerium, tungsten, carbon and iridium.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

22 [0022] A cathode material of the present invention improves the electron emission characteristics  
23 and the mechanical properties at the same time, by introducing a prescribed amount of carbon, and  
24